

Teacher Information

Ozone

I. OBJECTIVES

A. Forming Concepts (Introductory) Objectives

1. Locate the ozone layer of the atmosphere.
2. Explain natural formation of ozone.
3. List chemicals that react with ozone.
4. Explain how CFCs destroy ozone.

B. Interpreting Data Objectives

1. Interpret graphs of UV radiation.
2. Interpret graphs of ozone concentration.
3. Infer causation from graphs of ozone vs. chlorine concentrations.
4. Interpret graphs of stratospheric chlorine concentration.
5. Explain why artificial chemicals are more destructive to ozone than are naturally occurring chemicals.
6. Describe ozone's harmful effects at ground level.

C. Applying Principles Objectives

1. Describe the economic effects on people affected by ozone depletion.
2. Describe economic effects of banning CFCs.
3. Justify international ozone-related laws.

II. Interdisciplinary Uses

A. Social Studies

1. Predict the economic effects of ozone depletion.
2. Predict the economic effects of changing industrial installations due to banning CFCs.

B. Math

1. Calculate the present ozone concentration as a percentage of the ozone concentration in 1957.
2. Interpret graphs of ozone concentrations.

C. Language Arts

1. Write stories and give oral presentations about the ozone hole.

III. Science Standards Coordination

The Ozone activity has been designed to incorporate science standards as specified by the National Science Education Standards (NSES) and the National Science Teachers Association (NSTA) Scope, Sequence, and Coordination (SS&C) of Secondary School Science. Only the major topics are listed. For further explanation of each standard see the complete documents available from the addresses below.

NSES-National Academy Press, 2101 Constitution Ave, NW
Washington, DC 20481

NSTA - 1840 Wilson Blvd, Arlington, VA 22201-3000

NSES	SS&C
properties and changes	molecules
of properties of matter	bonds
personal health	sun as an energy source
transfer of energy	production of gases
natural hazards	chemical properties

IV. Advanced Preparation

A. Materials

1. One computer per three or four students
2. One copy of the student activity book for each student or group of students

B. Time required to complete the activity

1. Get info takes about 10 minutes.
2. Gather Data takes about 45 minutes.
3. Applying Principles takes about 25 minutes.

C. Teacher Familiarity

Preview these materials thoroughly. As with all these activities, before using this activity in class, review the sites and work through the activity yourself to learn about ozone depletion and urban problems with ozone so you can answer questions or direct the students to the answers.

The activity is set up so the students are taken to the pages that contain information that will be used to answer questions regarding ozone. The sites contain either the answers or the information from which the students can infer the answers. At the end of the activity, there is a list of enrichment activities and related web sites.

D. Select questions for students to answer.

It would be prudent for you to read the questions students will be expected to answer. These questions are in order of ascending difficulty. Depending on grade level and ability level, you might want to assign specific questions for your students.

E. Student Grouping

These activities can be done individually or in small groups of up to four students. They can also be done at home for extra credit by students who are on-line at home.

F. Software Requirements and Duplication Preparation

1. Download Adobe Acrobat viewer for your platform (Mac or PC).
2. Download this instructor manual and the student activity book pages from the USA Ozone introductory page.
3. Duplicate and distribute student pages. Each student should have a copy of the student activity book. Ideally, the student activity book should be distributed and discussed the day before the activity.